Accuracy Assessment of the National Land Cover Database 2001 Imperviousness Data

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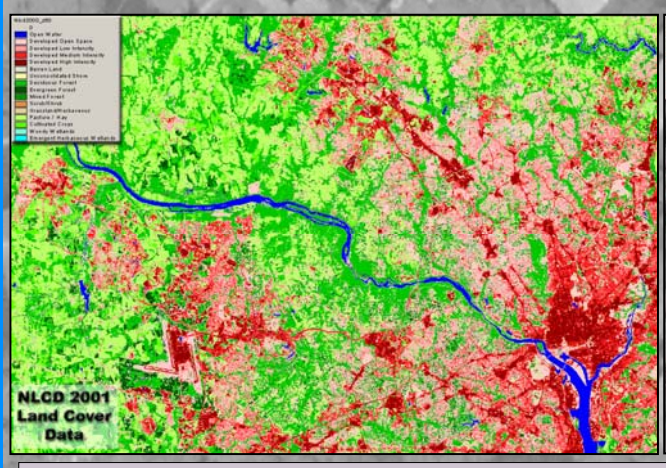
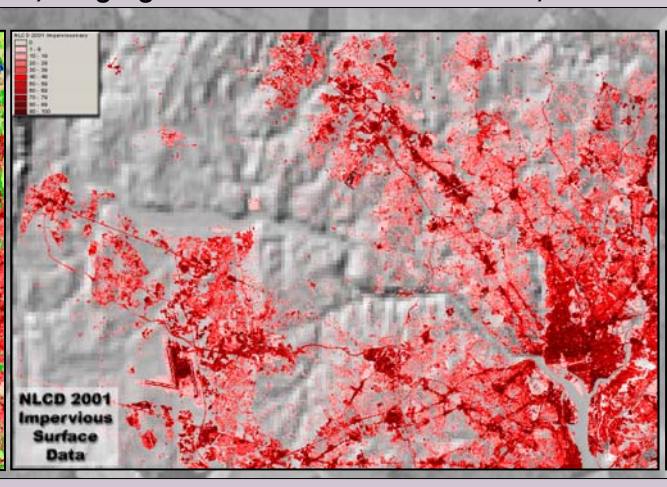
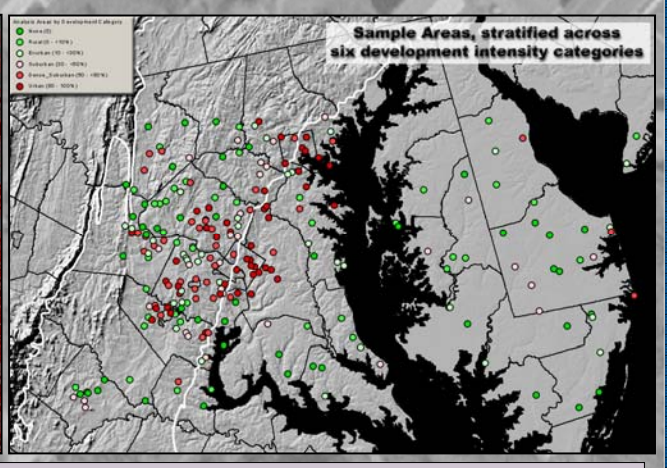
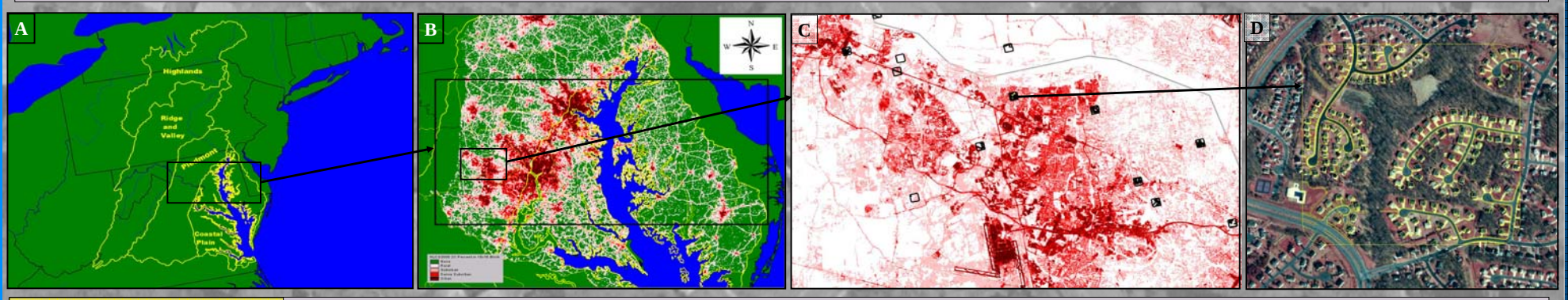
Background: **The National Land Cover Database 2001 (NLCD 2001) includes a per-pixel Land Cover and Imperviousness layer. Our accuracy assessment employs high-resolution, mapped vector truth impervious surfaces overlaid on the per-pixel Impervious data layer in a geographic information system (GIS) to assess satellite-based estimates of impervious surface area (ISA). This provides a means to assess the accuracy at multiple spatial scales. We used a stratified random sampling of analysis areas ("truth chips"), selected across a gradient of urban development, ranging from 'None' to '100% Urban', as defined by the NLCD 2001 Land Cover data.**



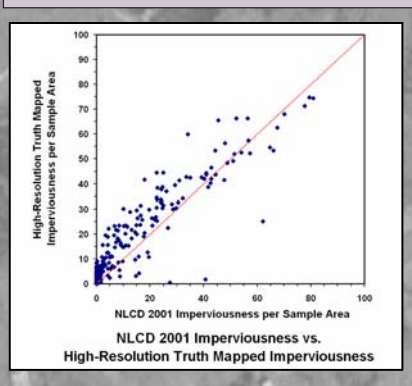




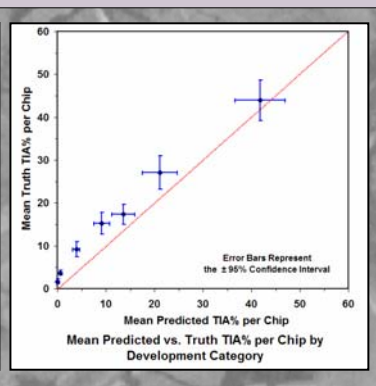
Methods: **We selected our sample areas from the Piedmont and Coastal Plain ecoregions within NLCD 2001 Mapping Zone 60. The highest possible resolution aerial imagery was used to map impervious surfaces within a sampled "truth chip." Chip size ranged from 25 to 32 hectares (62 to 80 acres). All anthropogenic impervious surfaces were mapped and the percent of total impervious area within the chip (TIA%) was calculated and compared to that estimated by the NLCD 2001 Imperviousness data for that chip.**



Preliminary Results: **We are finding a systematic underestimation of impervious surfaces by the NLCD 2001 Imperviousness data. This is true across our entire range of urban development intensity categories. We are currently analyzing our data to see if we can determine the causes of the apparent error we are observing. We will be extending our analysis to the Ridge and Valley and Highlands ecoregions of within the Chesapeake Bay watershed to see if this trend exists there and whether we can mathematically derive a correction factor.**



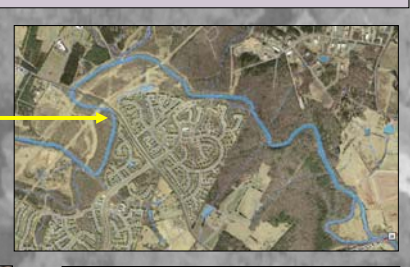
NLCD 2001 Imperviousness vs.
High-Resolution Truth Mapped Imperviousness



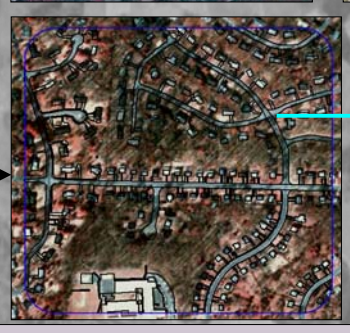
Mean Predicted vs. Truth TIA% per Chip by
Development Category

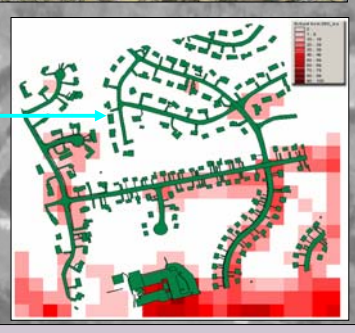
Development Category (% 'Urban' NLCD2001 Land Cover)	n	Mean Predicted %TIA per Chip	± 95% CI (Predicted %TIA)	Mean Truth %TIA per Chip	± 95% CI (Truth %TIA)	Mean Absolute Value of Error, %TIA per Chip	± 95% CI (Absolute Value %TIA)
None (0%)	46	0.00	0.00	1.66	0.58	1.66	0.58
Rural (0 - <10%)	39	0.57	0.16	3.70	0.59	3.15	0.57
Exurban (10 - <30%)	34	3.89	0.75	9.15	1.75	5.54	1.52
Suburban (30 - <50%)	28	9.14	1.65	15.20	2.51	7.10	1.85
Dense Suburban (50 - <80%)	38	21.11	3.56	27.10	3.88	10.48	1.99
Urban (80 - 100%)	46	41.79	5.12	43.95	4.73	8.02	2.41
Total	231	13.57	2.36	17.36	2.36	5.86	0.77

One source of error is Temporal Change. Chips that exhibit large discrepancies between "truth" and "predicted" ISA (i.e., outlier chips) have been individually examined and removed from our analysis where ancillary information indicates that urban development occurred just prior to NLCD 2001 image data collection.



Another source of error is Misclassification. Outlier chips reveal where overhanging vegetation and spatial pattern of development appears to cause errors in the NLCD 2001 imperviousness classification. These chips have remained in our analysis.





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